

REMARKS

This is in response to the Final Rejection in the Office Action mailed February 21, 2006.

Claims 1 through 6 are currently pending in the application.

Claims 1 through 6 stand rejected.

35 U.S.C. § 103(a) Obviousness Rejections

Obviousness Rejection Based on U.S. Patent 6,166,434 to Desai et al. in view of U.S. Patent 5,552,635 to Kim et al., and further in view of U.S. Patent 6,451,155 to Toy et al.

Claims 1 through 6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Desai et al. (U.S. Patent 6,166,434) in view of Kim et al. (U.S. Patent 5,552,635), and further in view of Toy et al. (U.S. Patent 6,451,155). Applicant respectfully traverses this rejection, as hereinafter set forth.

M.P.E.P. 706.02(j) sets forth the standard for a Section 103(a) rejection:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, **the prior art reference (or references when combined) must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (Emphasis added).

Turning to the cited prior art, the Desai et al. reference teaches or suggests a die clip for use in semiconductor flip chip packaging as a replacement for the combination of a heat spreader and stiffener, a packaging method using the die clip, and a semiconductor package incorporating the die clip. The die clip engages the die while leaving some space open around the perimeter to provide access to the die. An underfill material is dispensed into the gap between the die and the substrate through an opening in the die clip. The underfill material is then cured, the die clip providing a heat sink. A BGA process may then be used to apply solder balls to the underside of the substrate for bonding of the package to a circuit board for use.

The Toy et al. reference teaches or suggests silicon-containing polymeric adhesives (a silicon elastomeric material) used to attach a heat sink to a multi-chip module.

The Kim reference teaches or suggests a cap having a hole therein wherein the cap is sealed to a substrate to prevent the flow of mineral oil used as a dielectric fluid from the cap. The cap does not contact a semiconductor located therein.

Applicant asserts that any combination of the Desai et al. reference, the Toy et al. reference and the Kim reference cannot and does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed inventions of independent claims 1, 3, and 5 because there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings, if the references are combined the Desai et al. reference is destroyed for its intended purpose, and any combination of the cited prior art fails to teach or suggest all the claim limitations.

Applicant asserts that there is not suggestion or motivation whatsoever set forth in any of the cited prior art Desai et al. reference, the Toy et al. reference, and the Kim reference to either modify the Desai et al. reference or to combine the reference teachings to establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed inventions of independent claims 1, 3, and 5. Applicant asserts that solely Applicant's disclosure provides any suggestion or motivation for any combination of such cited prior art. Applicant asserts that because the teaching or suggestion to make the claimed combination and the reasonable expectation of success is found solely in Applicant's disclosure, any rejection based upon such cited prior art cannot and does not establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed inventions of independent claims 1, 3, and 5. Accordingly, independent claims 1, 3, and 5 are allowable as well as the dependent claims therefrom.

Applicant further asserts that the rejection of claims 1 through 6 under 35 U.S.C. § 103 based upon any combination of the cited prior art Desai et al. reference, the Toy et al. reference, and the Kim reference an impermissible hindsight reconstruction of the claimed inventions by picking and choosing among the elements of the cited prior art to reconstruct the claimed inventions. Such a hindsight reconstruction of the claimed inventions of independent claims 1, 3, and 5 is neither within the ambit nor purview of 35 U.S.C. § 103 and clearly improper.

Additionally, Applicant asserts that the proposed combination of the Desai et al. reference in view of the Toy et al. reference and in further view of the Kim reference destroys the teachings and suggestions of the Desai et al. reference for its intended purpose. The Desai et al. reference teaches or suggests a die clip engaging the die while leaving some space open around the perimeter to provide access to the die using an underfill material dispensed into the gap between the die and the substrate through an opening in the die clip. The Kim et al. reference teaches or suggests a cap having a hole therein wherein the cap is sealed to a substrate to prevent the flow of mineral oil used as a dielectric fluid from the cap. Applicant asserts that the inclusion of a hole in the Desai et al. die clip would act as a vent to allow any underfill material being injected into the gap to escape therefrom preventing the Desai et al. die clip from filling with the underfill material. Applicant asserts that such a modification to the Desai et al. die clip makes the die clip unable to perform its intended purpose of being sealed with underfill material. Accordingly, any combination of the Desai et al. reference in view of the Toy et al. reference and in further view of the Kim reference cannot and does not establish a *prima facie* case of obviousness regarding independent claims 1, 3 and 5 under 35 U.S.C. § 103. Therefore, independent claims 1, 3, and 5 are allowable as well as the dependent claims therefrom.

Applicant asserts that any combination of the Tay et al. reference and the Toy et al. reference does not and cannot establish a *prima facie* case of obviousness under 35 U.S.C. § 103 regarding the claimed inventions of presently amended independent claims 1, 3, and 5 because any combination of the Tay et al. reference and the Toy et al. reference, at the least, fails to teach or suggest all the claim limitations of the presently amended independent claims 1, 3, and 5. Applicant asserts that any combination of the Tay et al. reference and the Toy et al. reference fails to teach or suggest the claim limitations of presently amended independent claims 1, 3, and 5 calling for “placing a compliant adhesive-filled gel silicone elastomer between a portion of an upper surface of the semiconductor die and a portion of a lower surface of the heat sink cap, the heat sink cap surrounding the semiconductor die; pressing the semiconductor die into the heat sink cap to engage the semiconductor die and heat sink cap in compliant removable adhesion and for causing the edge of the heat sink cap to abut the substrate; and injecting an encapsulant into the heat sink cap through at least one hole therein engaging at least interior portions of the heat sink cap, at least portions of the semiconductor die, at least portions of the top surface of the

substrate, and at least portions of the compliant adhesive-filled gel silicone elastomer.”, “positioning a compliant adhesive-filled gel silicone elastomer between the semiconductor die and the cap, the cap surrounding the semiconductor die; pressing the semiconductor die into the cap causing removable adhesion of the semiconductor die and the cap and causing the lower edge of the cap to abut the substrate; and injecting an encapsulant into the cap through at least one hole therein engaging at least interior portions of the cap, at least portions of the semiconductor die, at least portions of the top surface of the substrate, and at least portions of the compliant adhesive-filled gel silicone elastomer. ‘, and “providing a compliant adhesive-filled gel silicone elastomer between a portion of an upper surface of the semiconductor die and a portion of a lower surface of the heat sink cap for engaging the semiconductor die and heat sink cap in compliant removable adhesion for abutting the edge of the heat sink cap to the substrate, the heat sink cap surrounding the semiconductor die; and placing an encapsulant into the heat sink cap through at least one hole therein for engaging interior portions of the heat sink cap, portions of the semiconductor die, portions of the top surface of the substrate, and portions of the compliant adhesive-filled gel silicone elastomer.” Applicant asserts that, in contrast to the claimed inventions of presently amended independent claims 1, 3, and 5, any combination of the Desai et al. reference in view of the Toy et al. reference and in further view of the Kim reference, at best, merely teaches or suggests a die clip filled with mineral oil wherein the semiconductor die is spaced from the cap having no contact therewith. Applicant asserts that such is clearly not the claimed inventions of presently amended independent claims 1, 3, and 5. Accordingly, presently amended independent claims 1, 3, and 5 are allowable as well as dependent claims 2, 4, and 6 therefrom respectively.

Applicant requests entry of this amendment for the following reasons:

The amendment is timely filed.

The amendment places the application in condition for allowance.

The amendment does not require any further search or consideration as no claim has been amended.

CONCLUSION

Claims 1 through 6 are allowable. Applicant requests entry of this amendment, the allowance of claims 1 through 6, and the case passed for issue. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicant's undersigned attorney.

Respectfully submitted,



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